DOCUMENT RESUME

ED 338 047 FL 019 708

AUTHOR Gerken, LouAnn
TITLE Performance Constraints in Early Language: The Case of Subjectless Sentences.
PUB DATE Jul 90
NOTE 9p.; In: Papers and Reports on Child Language Development, Number Twenty-nine. California, Stanford University, 1990. p54-61.
PUB TYPE Reports - Evaluative/Feasibility (142) -- Speeches/Conference Papers (150)

EDRS PRICE MF01/PC01 Plus Postage.
DESCRIPTORS Age Differences; Child Language; *Language Acquisition; *Language Processing; Language Research; *Language Rhythm; Linguistic Theory; Models; *Pronouns; *Sentence Structure
IDENTIFIERS *Subject (Grammar)

ABSTRACT

A discussion of English-speaking children's use of subjectless sentences contrasts the competence and performance explanations for the phenomenon. In particular, it reviews evidence indicating that the phenomenon does not reflect linguistic competence, but rather performance constraints. A tentative model of children's production is presented based on an integrated view of competence and performance to account for subjectless sentences as well as other language acquisition data. A group of 18 children with a mean age of 27 months were asked to imitate sentences in which subjects and objects were pronouns, proper names, or common noun phrases. The sentences were categorized according to meter. The children's omissions from the sentences indicate that, as predicted: (1) children omit subject pronouns more frequently than object pronouns or either proper or common noun phrases; (2) because subject articles always constitute a weak syllable in an iambic foot, they are omitted at the same rate as subject pronouns; and (3) object articles in sentences with a pronoun subject are omitted more frequently than object articles in sentences with proper or common noun phrase subjects and at the same rate as subject pronouns and subject articles. The results support the model's application. (MSE)

**********
* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *
**********

PRCLD 29 (1990)

"PERMISSION TO REPRODUCE THIS MATERIAL HAS BEEN GRANTED BY
Ann Clark
TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)"

U.S. DEPARTMENT OF EDUCATION
Office of Educational Research and Improvement
EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)
☐ This document has been reproduced as received from the person or organization originating it.
☐ Minor changes have been made to improve reproduction quality.
• Points of view or opinions stated in this document do not necessarily represent official OERI position or policy.

ED338047

FL019708

# PERFORMANCE CONSTRAINTS IN EARLY LANGUAGE: THE CASE OF SUBJECTLESS SENTENCES

LouAnn Gerken
Department of Psychology, State University of New York at Buffalo

## Introduction

The distinction between our knowledge of language (competence) and our use of language (performance) has been a given for most language researchers for 30 years. However, there are at least two views of the competence/performance distinction, the grammatical view and the integrated view. On the grammatical view, performance constraints arise from general cognitive architecture, such as memory and processing limits. For example, Chomsky (1965, p. 3):

> Linguistic theory is concerned with an ideal speaker-listener, ... who is ... unaffected by such grammatically irrelevant conditions as memory limitations, distractions, shifts of attention and interest and errors ...."

Because, on this view, performance constraints are non-linguistic in nature, linguistically regular phenomena can only reflect the competence system. Therefore, in the study of human language, performance constraints are not objects of study unto themselves, but rather impurities that must be filtered in our search for competence in its pristine form.

On the integrated view of competence and performance, language behaviors, such as comprehension and production, are self-contained representational systems that are separate from competence representations. Performance systems integrate constraints on the competence grammar with extra-linguistic processing systems, an integration that can yield linguistically regular data. Furthermore, because performance systems are internally consistent and self-contained, they can be separate objects of study. Examples of this view can be found in those parsers that are separate from particular grammars (e.g., Bever, 1970). Other examples can be found in models of speech production (e.g., Dell, 1986; Garrett, 1975). These may retain the multi-leveled notion of most competence grammars, but often have levels of representation and processes different from those in a grammar. Thus, Dell's speech production model posits a morphological level that is separate from the syntactic level. And Garrett's production model has a positional level at which, both content words are assigned phonological forms, and a sentence frame is created from function morphemes. Neither of these representational levels is typically included in formulations of a competence grammar. Slips of the tongue exemplify how performance systems integrate both processing and competence constraints. These are instances when the system breaks down, reflecting performance constraints. But it breaks down in linguistically regular ways; for example, word substitutions almost always involve words of the same syntactic class.



BEST COPY AVAILABLE

The view of the competence/performance distinction that child language researchers take often depends on the specific domain of acquisition that they are examining. On the one hand, many child phonologists have adopted the integrated view that performance systems are legitimate objects of investigation. Thus, children are thought to be constructing a production phonology that is constrained by their ability to produce particular motor sequences, by competence constraints on phonological rules, and by a cognitive constraint which pushes for an internally consistent system (e.g., Menn, 1983). On the other hand, researchers who study syntax acquisition are more likely to take the grammatical view that performance constraints are barriers to our direct observation of the more interesting competence system. An example of the grammatical view applied to acquisition is Hyams' (1986) proposal that young English speakers' subjectless sentences reflect an incorrect setting of the pro-drop parameter of Universal Grammar.

This paper contrasts competence vs performance explanations of English speaking children's subjectless sentences. In particular, it reviews evidence indicating that this phenomenon does not reflect linguistic competence, but rather performance constraints. It presents a tentative model of children's production based on an integrated view of compentence and performance to account for subjectless sentences as well as other language acquisition data.

Performance Constraints in Children's Subjectless Sentences

Several researchers have presented evidence indicating that children's subjectless sentences result from performance constraints. For example, Lois Bloom and her colleagues demonstrated that syntactic complexity, lexical unfamiliarity, and discourse primacy all were positively correlated with subject omissions (Bloom, 1970; Bloom, Miller & Hood, 1975). Valian (1989) demonstrated that English speaking children produce more subjects than their Italian counterparts, suggesting that young English speakers actually know that their language requires overt subjects. Valian also demonstrated that English speaking children's subject use increases with increasing MLU, which is not the case in Italian. This suggests that English speaking children's subjectless sentences are due in part to a limitation on the number of morphemes that can be produced in a given utterance. Paul Bloom (1989) has presented data indicating that utterances with longer VPs were less likely to contain subjects than utterances with shorter VPs. This set of facts cannot be easily accounted for within current competence frameworks. However, neither can they be easily accounted for by performance constraints if we accept the grammatical notion of the competence/performance distinction.

On the one hand, we need to explain the regularity of the phenomenon: children show a strong tendency to omit some sentential elements and not others. Such regularity reflects the child's linguistic competence on the grammatical view. On the other hand, there is a correlation between the frequency with which children omit certain sentential elements and the complexity of their intended utterance. Such a correlation reflects the non-linguistic system on the grammatical

view. Thus, the grammatical view forces theorists to deal with one of these issues or the other, but does not allow them to combine both into a single model. For example, Hyams (1986) and others who offer competence explanations for children's omissions focus solely on the regularity of the phenomenon. L. Bloom (1970) has attempted to deal with both issues in a two-part system in which a meta-competence-grammar (her "reduction transformation") exists to respond to processing constraints. Valian (1989) has also attempted to deal with the issues in a two-part system. She has suggested that children use the fact that subjectless sentences are often acceptable in adult English in order to reduce processing load. P. Bloom (1989) has suggested two possible explanations, one focussing on the regularity of the omissions, and the other focussing on the relation between complexity and omissions: (1) children use their pragmatic knowledge that subjects typically contain given information to omit them and thereby reduce processing load (e.g., Greenfield & Smith, 1976); (2) processing constraints allow children to expand utterances rightward only at the expense of leftward elements. What all of these explanations have in common is that the regularity in omissions is treated as reflecting some aspect of the child's linguistic knowledge, while the relation between omission and complexity is treated as reflecting non-linguistic performance constraints.

Contrast these explanations for subjectless sentences with one based on an integrated view of the competence/performance distinction. Here, regularity does not necessarily imply competence, but is reflective of performance systems as well. There are two facts about children's productions that are important for the present discussion: First, added complexity at higher levels of linguistic analysis may adversely affect lower levels. For example, Waterson (1978) discovered that a child's production of a word in isolation is often more phonetically accurate than the same word in a multi-word utterance. This suggests that the syntactic, semantic, and lexical complexity added by the increase from a single word to a multi-word utterance affects the child's production at the phonological level. Second, English speaking children are more likely to omit weak syllables from iambic metrical feet (weak-strong) than from trochaic feet (strong-weak; Allen & Hawkins, 1980; Gerken, Landau & Remez, 1990; Smith, 1973). Thus, giRAFFE is reduced to RAFFE, while MONkey is not reduced to MON.

A Metrical Account of Children's Subjectless Sentences

To test whether this metrical preference can account for English speaking children's subjectless sentences, I asked 18 children with a mean age 27 months and a mean MLU of 2.54 morphemes to imitate sentences in which subjects and objects were either pronouns, proper names, or common NPs (Gerken, 1989, 1990a). Sample stimuli analyzed into metrical feet are shown in 1a-i. (A plus sign signifies a boundary between metrical feet. Capitals signify stressed syllableless, lower case signifies unstressed syllables, underlining signifies weak syllables in iambic feet.) The rules used to assign metrical feet appear in 2a-d.

1a. he KISSED her
1b. he KISSED + JANE
1c. he KISSED + the LAMB
1d. PETE + KISSED her
1e. PETE + KISSED + JANE
1f. PETE + KISSED the + LAMB
1g. the BEAR + KISSED her
1h. the BEAR + KISSED + JANE
1i. the BEAR + KISSED the + LAMB

2a. A foot contains one and only one stressed syllable
2b. Assign exhaustive, maximally binary feet from left to right
2c. Function morphemes, including pronouns, are unstressed
2d. Metrical structure is independent of syntactic structure

Based on the metrically analyzed stimuli in 1a-i, and on the fact that children omit more weak syllables from iambic feet, we can make four predictions about omissions from these sentences: First, children should omit subject pronouns more frequently than object pronouns. This is because subject pronouns always constitute a weak syllable in an iambic foot, whereas object pronouns never occur in iambic feet in these stimuli. Second, because pronouns are weak syllables, subject pronouns should be omitted more frequently than either proper or common NP subjects. Third, because subject articles always constitute a weak syllable in an iambic foot, they should be omitted at the same rate as subject pronouns. And fourth, object articles in sentences with pronoun subjects should be omitted more frequently than object articles in sentences with proper or common NP subjects, and they should be omitted at the same rate as subject pronouns and subject articles. This is because object articles in sentences with pronoun subjects are weak syllables in iambic feet, whereas other object articles are in trochaic feet.

The data from the imitation experiment were consistent with children's spontaneous speech: they omitted more subject NPs than object NPs (see Figure 1), and their MLU's from spontaneous speech correlated signficantly with the frequency of their omissions in the imitation task ($r=.-55$; all reported results are significant at the $p<.05$ level or below by subjects and by items where appropriate). The other predictions were also borne out. Children omitted significantly more pronoun subjects than proper or common NP subjects (for a discussion of why proper or common NPs were omitted at all, see Gerken, 1989, 1990a). Children omitted significantly more subject articles than object articles. And, they omitted more object articles in sentences with pronoun subjects than in sentences with proper or common NP subjects. The latter result is especially important, because it indicates that children are not specifically omitting sentential subjects, but rather weak syllables from iambic feet. Such syllables are statistically more likely to be in subject position, but omission has nothing to do with subjecthood per se. Thus, a range of English speaking children's weak syllable omissions can be accounted for within the same metrical

framework.

Surprisingly, children omitted fewer subjects in sentences with object pronouns than in sentences with either proper or common NP objects. This may be because sentences with pronoun objects (1a, 1d & 1g) have one fewer feet than their counterparts with proper or common NP objects. Therefore, it appears that increasing utterance length in feet taxes the child's processing capacity, resulting in more frequent omissions.

I propose that children's more frequent omission of weak syllables from iambic feet is based on the fact that trochaic feet are the most frequent metrical structure in English. This can be seen in the fact that the vast majority of English words begin with a stressed syllable (Cutler & Carter, 1987). Because trochaic feet are so frequent in English, young English speakers may develop a trochaic production template in service of producing fluent speech. Weak syllables in feet that do not fit the template are omitted. But how can the template account for the findings that there is a relation between omissions and the linguistic complexity of the intended utterance? Figure 2 illustrates a tentative model that is based on models of speech production in adults (e.g, Dell, 1986; Garrett, 1975). This model attempts to provide a unified account for the relation between omissions and linguistic complexity as well as the regularity of children's omissions. In the model, an intended utterance is given a representation at several levels from the intended message to its articulation. Each level of representation has both templates for the canonical structure at that level and rules for creating many non-canonical structures. An intended utterance that can be produced solely with the canonical templates at each level can be produced nearly automatically. Whereas an intended utterance that does not fit the templates at one or more levels requires use of rules and increases the demand for processing resources.

The model explains how complexity at higher levels, (e.g., syntax and morphology) can effect omissions at lower levels, (e.g., metrical & segmental phonology) based on the fact that the further through the production process the intended utterance goes, the more likely it is that it has deviated from one or more templates. Due to resource limitations, template deviations at earlier levels of production necessitate the use of templates at later levels. Thus, an utterance that deviates from the syntactic or morphological template is more likely employ the template at the metrical level than an utterance that violates no templates prior to the metrical level. On this proposal, it is the use of a trochaic metrical template that causes omission of weak syllables from iambic feet.

The model can account for a variety of language acquisition data: If the template at the syntactic level is for intransitive declaratives, then children should be more likely to omit weak syllables in iambic feet from syntactic negatives than from sentences that do fit the template, as found by L. Bloom (1970; Bloom et al, 1975). Similarly, children should be more likely to omit weak syllables from iambic feet in transitive declaratives, as found by P. Bloom (1989). And if the

template at the morphological level is for two or three morphemes at the age in question (as indicated by MLU), then weak syllables in morphologically longer utterances should be omitted. This may explain Valian's (1989) finding that English speaking children's subject use increased with increasing MLU, as well as the more general finding that use of function morphemes increases with MLU (e.g., Brown, 1973). It is also consistent with findings that weak syllable omissions increase with the number of morphemes as opposed to number of syllables (Gerken, 1987; Gerken et al, 1990).

The model has separate representations for foot formation and stress assignment. (See Halle & Vernaud, 1987, for a similar proposal.) This accounts for two aspects of the data from the current experiment: First, it accounts for the finding that children omitted fewer weak syllables from iambic feet in target sentences containing fewer feet in total. Second, if children used the S-W template to both form feet and assign stress, then they should not have omitted object articles from sentences like 1c in those cases where they omitted the subject pronoun. The process of assigning only an S-W template is illustrated in example 3. If the first weak syllable is omitted because it does not fit the S-W template, then the object article falls into a trochaic foot and therefore should not be omitted. An analysis of the data showed that object article omission in sentences like 1c occurred independently of whether the subject pronoun was omitted, suggesting separate representation of foot formation and metrical template assignment. (For a discussion of why children might represent these separately, see Gerken, 1990b.) Finally, the model is consistent with Waterson's (1978) finding that children's segmental accuracy decreases as utterance length increases, because an utterance that deviates from templates at earlier levels will be more likely to employ a template at the phonological level.

3. she KISSED the BEAR
|S (W)| |S (W)|

The model provides an integrated account for both the regularity of children's omissions and their relation to sentence complexity. In particular, it allows the possibility that regular child language phenomena do not necessarily imply linguistic competence, but can also reflect performance systems. It is important to note that the model does not account for the range of data by simply combining all possible factors that may have some effect on children's omissions, but rather it makes testable predictions. For example, violating one template should result in X omissions of weak syllables from iambic feet, and violating two should result in X+Y omissions. It is only by taking the integrated approach to the competence/performance distinction and developing testable models of young children's performance that we will obtain a true picture of their linguistic competence.

## References


Allen, G. & Hawkins, S. (1980). Phonological rhythm: definition and development. In G.H. Yeni-Komshian, J.F. Kavanagh, and G.A. Ferguson (eds.), Child phonology, Volume 2: production. NY: AP.

Bever, T.G. (1970). The cognitive basis for linguistic structures. In J.R. Hayes (ed.), Cognition and the development of language. NY: Wiley.

Bloom, L. (1970). Language development: form and function in emerging grammars. Cambridge, MA: MIT Press.

Bloom, L., Miller, P., & Hood, L. (1975). Variation and reduction as aspects of competence in language development. Minnesota Symposium on Child Psychology, 9, 3-55.

Bloom, P. (1989). Why do children omit subjects? PRCLD, 28, 57-63.

Brown, R. (1973). A first language. Cambridge, MA: HUP.

Chomsky, N. (1965). Aspects of a theory of syntax. Cambridge, MA: MIT Press.

Cutler, A. & Carter, D.M. (1987). The predominance of strong initial syllables in the English vocabulary. CSL, 2, 133-142.

Dell, G.S. (1986) A spreading activation model of retrieval in sentence production. PR, 93, 283-321.

Garrett, M.F. (1975) The analysis of sentence production. In G. Bower (ed.) Psychology of learning and motivation, Vol. 9, NY: AP.

Gerken, L.A. (1987). Telegraphic speaking does not imply telegraphic listening. PRCLD, 26, 48-55.

Gerken, L.A. (1989). Children's subjectless sentences: Competence or performance? Unpublished manuscript, SUNY at Buffalo.

Gerken, L.A. (1990a). A metrical account of subjectless sentences. NELS, 20.

Gerken, L.A. (1990b). Do adults and children have different feet? CLS, 26.

Gerken, L.A., Landau, B. & Remez, R.E. (1990). Function morphemes in young children's speech perception and production. DP, 27, 204-216.

Greenfield, P. & Smith, J. (1976). The structure of communication in early language development. NY: AP.

Halle, M. & Vernaud, J.R. (1987). An essay on stress, Cambridge, MA: MIT Press.

Hyams, N. (1986). Language acquisition and the theory of parameters. Dordrecht: Reidel.

Menn, L. (1983). Development of articulatory, phonetic, and phonological capabilities. In G.H. Yeni-Komshian, J.F. Kavanagh, and G.A. Ferguson (eds.), Child phonology, Volume 2: production. NY: AP.

Smith, N.V. (1973). The acquisition of phonology. Cambridge, England: CUP.

Valian, V.V. (1989). Children's production of subjects: Competence, performance, and the null subject parameter. PRCLD, 28, 156-163.

Waterson, N. (1978). Growth of complexity in phonological development. In N. Waterson and C. Snow (eds.), The development of communication. NY: Wiley.

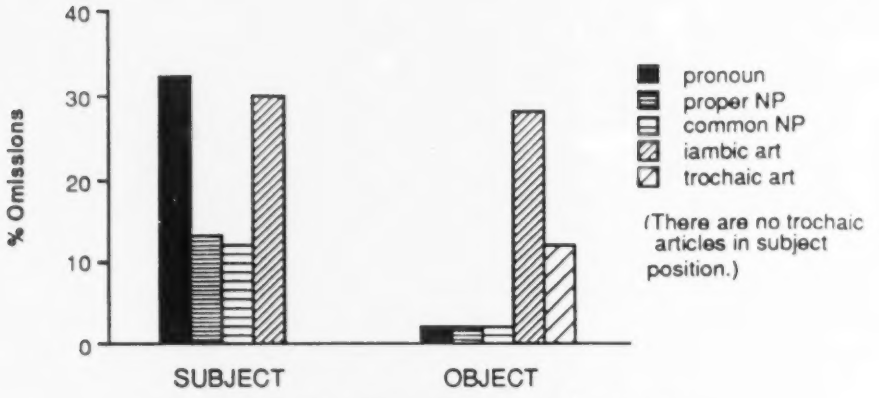


*Figure 1, Omissions from Subject and Object Positions*

| Linguistic Level | Data Accounted For |
|---|---|
| Message | |
| Semantic Rules & Templates<br>S -> Agent Action | |
| Syntactic Rules & Templates<br>S -> Subject Verb | L. Bloom (1970)<br>P. Bloom (1989) |
| Morphological Rules & Templates<br>\| m1 \| m2 \| | Valian (1989)<br>Gerken (1987)<br>Brown (1973)<br>Waterson (1978) |
| Foot Formation Rules & Templates<br>\| s1 \|(s2)\| \| s1 \|(s2)\|<br>(s1 or s2 must be strong) | current study<br>(see text) |
| Metrical Rules & Templates<br>\| S \|(W)\| | weak syllable omission<br>from iambic feet |
| Phonological Rules & Templates<br>\| C \| V \|(C)\| | e.g., consonant<br>cluster reduction |

*Figure 2, Template Model of Speech Production*

*(Lower case "m" = morpheme, lower case "s" = syllable)*